

FACT SHEET

HSWA PERMIT UNDER THE 1984 HAZARDOUS AND SOLID WASTE AMENDMENTS TO THE RESOURCE CONSERVATION AND RECOVERY ACT FOR THE PROPOSED FINAL REMEDY

CHEVRON PRODUCTS REFINERY, PASCAGOULA, MISSISSIPPI EPA ID NUMBER MSD054179403

INTRODUCTION

This Fact Sheet is prepared pursuant to 40 Code of Federal Regulations (CFR) § 124.8 for a permit re-issuance developed by the U.S. Environmental Protection Agency (EPA) for the Chevron Products Company Pascagoula Refinery, (hereinafter Chevron Products Company, the refinery, or the facility) located at 250 Industrial Road, Pascagoula, Mississippi. The EPA ID number of this site is MSD054179403. The Fact Sheet briefly sets forth the principal facts and the significant factual, legal, methodological and policy questions considered in preparing this permit which includes selection of the site-wide remedy.

This Fact Sheet has been developed by the EPA, in order to inform the public about the proposed corrective measures, and to give the public an opportunity to comment on the proposed HSWA Permit and remedy for corrective action at the site.

PERMIT PUBLIC NOTICE

The EPA and the Chevron Products Company are soliciting public review and comment on the draft HSWA Permit and the proposed remedy for the entire facility. Some of the corrective measures have already been implemented.

The public comment period for this Fact Sheet and the proposed corrective measures will begin on October 18, 2006, and end 60 days thereafter on December 18, 2006.

Depending on the scope of the comments received during the public comment period, EPA and Chevron Products Company may schedule a public meeting to clarify any details of the proposed corrective actions and to answer any further questions by the community. To provide written comments, please contact:

Mr. Donald L. Webster
US EPA Region 4
61 Forsyth Street S.W.
Atlanta, GA 30303
(404) 562-8469
Webster.Donald@epa.gov <mailto:Webster.Donald@epa.gov>

The HSWA Permit, the Performance Agreement, the RCRA Facility Assessment Reports, the RCRA Facility Investigation Reports, the Interim Measures Report, the Corrective Measures Study Report, Monitored Natural Attenuation Reports, Semi-Annual Reports, the draft Ecological Risk Assessment, Environmental Indicators (all except the first RCRA Facility Assessment Report) are available electronically.

Copies of the Fact Sheet and Draft HSWA Permit are available for viewing or copying at the following libraries:

Jackson/George Regional Library System
3214 Pascagoula Street
Pascagoula, MS 39567

US EPA Region 4 Library
Sam Nunn Federal Building 9th Floor
61 Forsyth Street S.W.
Atlanta, GA 30303

They are also available for viewing in Adobe Acrobat format on EPA Region 4's website at:
<http://www.epa.gov/region4/waste/rcra/rpb.htm>

Electronic copies of the same documents in electronic format can also be obtained from the facility representative:

Mr. John H. Leech
Chevron Products Company
PO Box 1300
Pascagoula, Mississippi 39568-1300
(228) 938-4258
JHLJ@ChevronTexaco.com

FACILITY DESCRIPTION

Facility Background and History

The refinery was built in the early 1960's and went into operation in 1963. The refinery is owned by Chevron U.S.A, Inc., and is operated by Chevron Products Company, a division of Chevron U.S.A. Inc. The refinery property consists of approximately 3,000 acres, 2,600 acres of which were acquired in 1961-62 with an additional approximate 450 acres added in 1980-81. A total of 1,000 acres have been developed industrially; this area is known as the Operational Area, and is bounded by the Operational Boundary, as shown in Figure 1. The Facility Boundary is a larger area that encompasses all the facility property. The HSWA Permit refers to both the Operational Boundary and the Facility Boundary.

[illegible]

- 3 -

The facility was originally designed as a 150,000 barrel per day petroleum refinery. The configuration changed to include a petrochemical facility with the addition in 1966 of the Paraxylene Plant and the Ammonia Plant. Additional petrochemical facilities were added, as well as additional crude capacity and associated processing units. The refinery has seen a number of expansions and modifications over the past 40 years that have included the doubling of crude processing capacity. Recent additions include the Pascagoula Residuum Conversion Project in 1980, the Aromax Project in 1992, the Paraxylene Expansion Project in 1996 and the Clean Fuels Project in 2002. The refinery currently processes, on average, up to about 325,000 barrels per day of crude oil and manufactures a variety of gasoline, liquefied petroleum gas, jet and diesel fuels and petroleum coke as well as paraxylene, benzene, ethylbenzene and sulfur.

The Pascagoula Refinery is the largest of Chevron Products' refineries in the United States and one of the ten largest refineries in the United States. Additional information can be found on the Refinery's website at www.chevronpascagoula.com.

REGULATORY HISTORY

This is the third HSWA permit issued to the facility, the first was issued on April 15, 1986, and the second on September 26, 1997. The facility conducted the first RCRA Facility Assessment (RFA) in 1986. In August 1990, a second RFA was conducted by EPA, which resulted in a new list of SWMUs requiring further action. The second RFA resulted in the list of SWMUs that has been under corrective action since the 1997 HSWA permit was issued.

RCRA Facility Investigations

RCRA Facility Investigations (RFIs) have been conducted at various times in the facility's history. The facility submitted a Phase I RFI Sampling and Analysis Plan in June 1993 that addressed all SWMUs and AOCs identified by the EPA as requiring further action. After comments and responses, the EPA approved the Phase I RFI Work Plan in June of 1994. The field implementation of the Phase I RFI was completed in March of 1995, and the Phase I RFI Report was submitted to the EPA in June 1995. The Phase I RFI Report recommended No Further Action (NFA) for certain sites and the need for a Phase II RFI for the remaining corrective action sites.

The facility submitted the Phase II RFI Work Plan to the EPA in March 1996, and in September 1998, the EPA issued conditional approval. The Phase II RFI field effort was completed in July 1999. The Phase II RFI Report (Final RCRA Facility Investigation and AOC Confirmatory Sampling Report) was submitted to the EPA in September 2001 and was given conditional approval by EPA in April 2002. The major remaining portion of the RFI process is completion of the Ecological Risk Assessment (ERA) at Lagoon No. 3.

As part of the RFI activities, a site-wide Human Health Risk Assessment (HHRA) and a Screening Level Ecological Risk Assessment (SLERA) were conducted to estimate the likelihood that exposure to metals or chemicals in various media at each SWMU or AOC could pose a potential health risk to humans or the environment. The site-wide HHRA identified no

potential for an adverse effect to human health. The potentially significant and complete exposure pathways were identified for all media (soil, sediment, surface water, and groundwater) at the facility and include:

- Direct contact with soil by on-site workers (ingestion and dermal contact),
- Dermal exposure by on-site construction workers to groundwater,
- On-site maintenance worker contact with surface water,
- Exposure to all media by on-site trespassers.

These potential exposures are, and will be controlled by internal facility controls, monitored by the EPA. These controls include, but are not limited to, construction permit approvals prior to initiation of any work, rights of way including oil and gas corridors, ‘no dig’ controls, safety and environmental monitoring of known or suspected contamination sites, and contractor and employee safety and health training.

The findings of the SLERA indicated that concentrations of several metals in sediments in some SWMUs and AOCs exceeded screening ecological levels from EPA Region 4, particularly with metals found in the sediments of Lagoon No. 3. Due to site specific conditions, exposure of ecological receptors is limited with the exception of Lagoon No. 3. The SLERA indicated that Lagoon No. 3 could provide an attractive habitat to wildlife. A site specific ERA for Lagoon No. 3 was completed in January 2005, but has not yet been approved by EPA; and, recommendations for achieving the Performance Standards at this location, also known as SWMU 10, are still under evaluation at this time.

Description of SWMUs and AOCs

The current status of all SWMUs and AOCs at the facility is listed in the following table.

Table 1. Current corrective action status of SWMUs and AOCs at the Chevron Products Refinery, Pascagoula, Mississippi.

SWMU/AOC NUMBER	SWMU/AOC NAME	CURRENT STATUS	UNIT COMMENT
1	Landfill A	CMS	Remedy Not Yet Implemented
2	Landfill B	CMS	Remedy Not Yet Implemented
3	Landfill C	CMS	Remedy Not Yet Implemented
4	Landfill D	CMS	Remedy Not Yet Implemented
5	Landfill E - Corning	NFA	
6	Skim Pond	NFA	Wastewater SWMA
7	Aeration Basin	TBA	Wastewater SWMA
8	Lagoon No. 1	TBA	Wastewater SWMA
9	Lagoon No. 2	TBA	Wastewater SWMA
10	Lagoon No. 3	ERA	Remedy Not Yet Implemented

SWMU/AOC	SWMU/	CURRENT	UNIT
NUMBER	AOC NAME	STATUS	COMMENT
11	South Surge Pond	TBA	Wastewater SWMA
12	North Surge Pond	TBA	Wastewater SWMA
13	Cooling Tower Blowdown Pond	NFA	
14	Corning Site Wastewater Lagoons (2)	NFA	
15	Coke Storage Area Pond	NFA	
16	TEL Weathering Area (East Hill)	NFA	RFA
17	API Separator No. 1	NFA	
18	API Separator No. 2	NFA	
19	API Separator No. 6	NFA	
20	API Separator No. 7	NFA	RFA
21	Dissolved Nitrogen Flotators (DNF) No. 1&2	NFA	RFA
22	Induced Nitrogen Flotator No. 1 and Ballast INF	NFA	RFA
23	RDS Catalyst Storage Area	NFA	RFA
24	Former Catalyst Storage Areas	NFA	RFA
25	Waste Container Storage Area (long - term)	NFA	RFA
26	East Catalyst Pad	NFA	Regulated Under State Permit
27	South Catalyst Pad	NFA	RFA
28	North Landfarm	NFA	Regulated Under State Permit
29	East Landfarm	NFA	Regulated Under State Permit
30	COD Pond	NFA	RCRA Clean Closed
31	Caustic Area Storage Pond	NFA	RCRA Clean Closed
32	Wharf Area Retention Pond	NFA	
33	Dredge Spoil Area	NOTE ¹	Removed from EPA List
34	Ammonia Plant Demineralizer Ponds (2)	NFA	
35	Acid Area Retention Pond	NFA	Monitoring required
36	Closed TEL Weathering Area	NFA	RCRA Clean Closed
37	Old Catalyst Pile A	NFA	RFA
38	Old Catalyst Pile B	NFA	RFA

SWMU/AOC NUMBER	SWMU/ AOC NAME	CURRENT STATUS	UNIT COMMENT
39	Corning Site Lime Waste	NFA	RFA
40	Recovered Oil Tanks No. 181, 190, 192	NFA	Monitoring required
40A	Recovered Oil Tank No. 90	NFA	
41	Sour/Foul Water Tanks No. 180, 191, 193, 197, 198	NFA	RFA
42	Spent Caustic Tanks No. 70, 71, 72, 73, 75, 76	NFA	RFA
43	Spent Caustic Tank No. 80	NFA	RFA
44	Spent Sulfuric Acid Tanks No. 44, 45, 48	NFA	Monitoring required
45	RDS Catalyst Washwater Tank No. 8100	NFA	RFA
46	COD Tanks No. 3200, 3201	NFA	RFA
47	Oily Sludge Coking and Recycling System (OSCAR)	NFA	RFA
48	Hazardous Waste Container Storage Area(s)	NFA	RFA
49A - P	Drum Pick-Up Areas (16)	NFA	RFA
49Q	Drum Pick-Up Area	NFA	
50	Roll off Hazardous Waste Container(s)	NFA	RFA
51	Wharf Area Neutralization Unit	NFA	RFA
52	Alky Neutralization Unit	NFA	RFA
53	Alky II Neutralization Unit	NFA	RFA
54	Acid Storage Neutralization Unit	NFA	RFA
55	Ammonia Plant Neutralization Unit	NFA	RFA
56	RDS Catalyst Transfer Pad	NFA	Reintroduced in Phase II
57	North Canal	NFA	Monitoring required
58	South Canal	NFA	
59	Drum Rinsing/Cleaning Area	NFA	RFA
60	Fire Training Area	CMS	Remedy Not Yet Implemented
61	Air Emissions Control Devices	NFA	RFA
62	Oil Recovery Unit (former API Separator No. 5)	NFA	RFA
63	Wastewater Sumps & Oil Spillage Containment Areas	NFA	RFA
64	Old Tank Truck Loading Rack	NFA	

SWMU/AOC NUMBER	SWMU/AOC NAME	CURRENT STATUS	UNIT COMMENT
65	Product Tank No. 173	NFA	Monitoring required
66	Product Tank No. 331	NFA	Monitoring required
67	Asphalt Dump Area	NFA	RFA
68	Old FCC Catalyst Fines Disposal Area	NFA	
69	Paint Storage Area	NFA	
70	Caustic Storage Area & Sump	NFA	
71	Blending Chemical Additive Area	NFA	Monitoring required
72	Landfill Underneath TEL Weathering Area	CMS	RemedyNot Yet Implemented
73 HERE	KR-20 Yard	NFA	
74	Tenemene Area at FCC	NFA	
75	Abandoned Fill Line for Old UST	NFA	
76	Wharf Area Product Dock Shoreline Revetment	CMS	Monitoring required
77	Paraxylene Complex	CMS	Monitoring required
78	Treater Section for Crude Unit No. 2	NFA	
79	Blending & Shipping Tank Field Area	NFA	Monitoring required
80	Oily Dirt Pile	CMS	Monitoring required
81	Spill Trench at Alkylolation Unit #1	NFA	
82	Landfill at East Hill	CMS	RemedyNot Yet Implemented
83	Tank No. 333	NFA	Monitoring required
84	West Ditch	NFA	
85	Middle Ditch	NFA	Monitoring required
86	Spiral Lift Pit at #7 Separator	NFA	

NOTE¹ Not Considered a SWMU or AOC.

Blue - Indicates a site requiring a CMS.

Green - Indicates a site that has achieved NFA-ATT status.

Yellow - Indicates units to **be addressed (TBA) when taken out of service. Units are currently part of active, permitted NPDES wastewater treatment system**

SWMU - Solid Waste Management Unit

AOC - Area of Concern

TBA - To Be Addressed when taken out of service

NFA - No Further Action

ERA - Ecological Risk Assessment

IM - Interim Measures

CMS - Corrective Measures Study

SWMA - Solid Waste Management Area

Corrective Measures Study

In year 2002, EPA called for a final Corrective Measures Study (CMS) that would encompass the site-wide remedy. The facility responded with a Corrective Measures Study Report, approved by EPA in April 2004, wherein the alternatives for the proposed remedy at the entire site were presented. Subsequently, in August 2004, four Monitored Natural Attenuation Reports (MNA Reports) and in January 2005 an Ecological Risk Assessment (ERA) Addendum were presented to EPA as part of the proposed remedy. Three of these MNA Reports have been approved by the EPA. The MNA Report at the Paraxylene Complex is still under review by the EPA at the time of this permit issuance, and EPA is reviewing the Final ERA. In addition, EPA expects to receive corrective action completion reports under the HSWA Permit as various components of the final remedy are completed or constructed.

There were 88 SWMUs and/or AOCs identified during the two RFAs. The current status of each of these 88 sites is shown in Table 1. As shown on Table 1, to date, a total of 77 of these sites have achieved a No Further Action Status (NFA), a To Be Addressed (when the facility closes) Status (TBA) or were determined not to be SWMUs or AOCs (in the case of SWMU 33 only) based on evaluation of the Phase I RFI, Phase II RFI, Risk Assessments, AOC Confirmatory Sampling results, Interim Measures and Corrective Measures Study Reports. The remaining 11 SWMUs and AOCs were evaluated and addressed in the CMS; and several of these SWMUs will be addressed in the Ecological Risk Assessment as part of the East Hill and Lagoon No. 3.

Development of Remedies and Alternatives

A wide range of corrective measures and alternatives were evaluated as part of the CMS. In order to evaluate corrective measures at specific sites, Chevron Products Company performed additional field studies as part of the CMS, including a pH treatability study and a Multi-phase Extraction (MPE) engineering study. The pH treatability study was performed for soil and groundwater at the Acid Sites to evaluate the possibility of using neutralizing additives as an in-situ treatment option. The MPE engineering study was conducted initially at the Paraxylene Complex to determine design parameters and costs for remedy alternative evaluation. During the study the effectiveness of MPE as a corrective action technology was challenged and the technology eventually rejected as a viable alternative. No final Corrective Measures have been decided upon for the Paraxylene Complex at the time of this permit issuance; however, source control and an MNA Study are underway.

Performance Agreement

The United States Environmental Protection Agency and the Chevron Products Company signed a Performance Agreement on May 3, 2004, to enable the Chevron Products Company to complete RCRA Corrective Action at the Pascagoula, Mississippi Refinery in an expeditious manner. The basis of the Performance Agreement is the OSWER guidance document entitled EPA Results-Based Approaches and Tailored Oversight Guidance for Facilities Subject to Corrective Action under Subtitle C of the Resource Conservation and Recovery Act, EPA530-R-03-012, dated September 2003, and the guidance, policy and regulations cited therein. The

Parties believe that the Chevron Products Company can efficiently and effectively remediate the Site to meet the Performance Standards described in the permit using the Performance Agreement as the corrective action mechanism, in a more appropriate time frame than a traditional permit alone.

Chevron Products Company is responsible under the Performance Agreement for meeting cleanup standards. If a remedy selected in the CMS is found by Chevron Products Company or the EPA to be inadequate to address final performance measures, then Chevron Products Company is responsible for replacing it with one that is effective.

The potential corrective measures that were identified as appropriate for the individual SWMUs and AOCs at this facility are provided below:

- Source removal,
- Slurry wall,
- Permeable/Reactive barriers,
- Dual-phase extraction,
- Pump and treat,
- Air sparging,
- Bioventing,
- Enhanced bioremediation,
- Monitored natural attenuation,
- Perimeter monitoring, and/or
- Institutional controls.

Remedy Alternative Screening

Corrective measure alternatives for each site were screened using the information on site specific conditions and applying the technology-specific information to the proposed performance goals. Screening of the corrective measure and alternatives included consideration of nine general standards and remedy decision factors listed in the CMS Report.

Remedy Alternative Evaluations

The alternative evaluation process included preliminary remedial design and cost estimating for the screened alternatives for each remaining SWMU or AOC that was not NFA. For the preliminary remedial design, Chevron Products Company evaluated each alternative based on identified Performance Standards, site specific hydro-geological

conditions, and site specific vertical and lateral extent of impacted media. Engineering assumptions were made for items such as impacted soil volumes, number of recovery wells required, recovery well spacing, collection and discharge points, and location of treatment units.

Corrective measures were then paired for soil and groundwater to develop overall alternatives for each remaining SWMU or AOC that was not NFA. Each alternative allowed for remediation of

both soil and groundwater media, and sediment where appropriate. The remedial alternative pairings were evaluated to determine site specific technology requirements, limitations and equipment needs. A cost estimate was then developed for each remedial technology. Chevron Products Company evaluated each of the alternative pairings for safety in operations when implementing the various alternatives, business risk, and effectiveness for the constituents and in the media of concern, permanence, reliability, reduction of toxicity, mobility or volume, constructability, capacity design and additional impacts to other sites or other media.

The CMS Report for the remaining SWMUs and AOCs requiring corrective action was approved by EPA in April 2004. Activities in the CMS included additional field evaluations, various treatability studies, and technology feasibility studies. Once all the preliminary data was collected and studies were complete, Chevron Products Company further evaluated various corrective measures for the remaining sites under corrective action and EPA reviewed the various proposed corrective measures alternatives presented in the CMS Report.

In reviewing the process and length of time the Corrective Action Process has taken, and on the basis of the OSWER guidance document entitled, EPA Results-Based Approaches and Tailored Oversight Guidance for Facilities Subject to Corrective Action under Subtitle C of the Resource Conservation and Recovery Act, and the guidance, policy and regulations cited therein: EPA and Chevron began discussions of methods and processes to abbreviate this time period and stimulate the corrective action process. After several months of review, discussion and negotiation, EPA and Chevron Products Company signed the Performance Agreement in May, 2004. In this document, Chevron Products Company and EPA agreed to establish Performance Standards for the final remedy for corrective action. These standards are protective of human health and the environment, and take into consideration site specific conditions and future land use considerations. Chevron Products Company is responsible for ensuring that all corrective measures implemented under the Performance Agreement will achieve the Performance Standards, and if those measures fail to, Chevron Products Company will change or modify the corrective measures to insure that they meet these Performance Standards. These standards are found in Section V of the draft HSWA permit.

The remaining SWMUs and AOCs that EPA has required to be addressed for the final remedy are categorized into eight groups, based on similar processes, similar constituents of concern or similar location within the facility. The eight groups are listed below:

Wharf Revetment Area - includes AOC 76 (Wharf Area Product Dock Shoreline Revetment). This area requires some reconstruction of the revetment, and must continue to be monitored.

Lagoon No. 3 - includes SWMU 10, (Lagoon No. 3) a stormwater/wastewater pond that is part of the NPDES Storm water retention system at the plant.

MNA Sites - includes AOCs 65 (Tank 173), 66 (Tank 331), 77 (Paraxylylene Complex), and 83 (Tank 333) Three of the four MNA sites are No Further Action at the time of this permit issuance, as long as monitoring and engineering controls remain in place: AOCs 65 (Tank 173), 66 (Tank 331), and 83 (Tank 333).

Acid Sites - includes the Stormwater Solid Waste Management Area (SWMA) (SWMU 35 - Acid Retention Pond and SWMU57 - North Canal) and AOC 44 (Spent Sulfuric Acid Tanks 44, 45, and 48). This area requires No Further Action at this time but must continue to be monitored.

Metals Sites - includes AOC 71 (Blending Chemical Additive Area) and AOC 85 (Middle Ditch). This area requires No Further Action at this time but must continue to be monitored.

Miscellaneous Tankfield Sites - includes West Tankfield and Tank 423 (both part of AOC 79 - Blending and Shipping Tankfield Area) and Tank 190 (part of AOC 40 - Recovered Oil Tanks 181, 190, and 192). This area requires No Further Action at this time but must continue to be monitored.

East Hill Area - includes SWMUs 1 (Landfill A), 2 (Landfill B), 3 (Landfill C), 4 (Landfill D), 60 (Fire Training Area), and AOCs 72 (Landfill beneath TEL Weathering Area) and 82 (Landfills Underneath the East Landfarm / East Catalyst Pad)

Wastewater Treatment Area- includes the Wastewater SWMA, SWMU 7 (Aeration Basin), SWMU 8 (Lagoon No. 1), SWMU 9 (Lagoon No. 2), SWMU 11 (South Surge Pond) and SWMU 12 (North Surge Pond). These units are currently part of the Refinery's active wastewater treatment system, regulated under the NPDES program and permit. As such, these units will not be addressed under the RCRA Corrective Action program, unless or until those units are no longer in service. Further, SWMU 6, which is part of this SWMA, has already received a No Further Action designation.

PROPOSED FINAL CORRECTIVE MEASURES

The following sections contain the Statement of Basis for the entire facility remedy at the remaining corrective action areas of the Chevron Products Refinery in Pascagoula, Mississippi. For a more detailed discussion of the site hydrogeology, background, remedy alternatives etc., the reader is referred to the Corrective Measures Study for the Chevron Products Pascagoula Refinery, dated April 2004. This document can be obtained from the facility representative or the EPA contact listed in this Fact Sheet.

Wharf Revetment Area

The Wharf Revetment Area is located on the western edge of the facility along the banks of Bayou Casotte. It is an approximately 300-foot long sloping concrete revetment structure installed at the water's edge in 1986 to stabilize and control erosion along the bank of the bayou. It was extended and shored up in August 2005, just before Hurricane Katrina struck. Parts of the revetment have been repaired or replaced since August 2005 and Bayou Casotte continues to be observed for releases.

Recurring hydrocarbon sheens have appeared on the water around the revetment continuing into the present. The only known major release in this area occurred during the wharf fire in 1986 when numerous product lines in the area were ruptured from the intense heat of the blaze. However, a recent release was discovered in 2003 from a sump located 50 feet east of the revetment, which is believed to be a possible source of petroleum hydrocarbon impacts to

groundwater. This sump was repaired in December 2003 and lined to prevent future releases.

Summary of Potential Risks

The Constituents of Concern (COCs) identified for human health at the Wharf Revetment Area during the RFI were:

- **Groundwater:** Arsenic, benzene, beryllium, chromium, lead, naphthalene and vanadium were detected in the groundwater from this site. There is no risk of groundwater exposure to humans since the uppermost aquifer is not a drinking water aquifer.
- **Soil:** Benzene, ethylbenzene and xylenes were identified in soil samples collected from this site.
- **LNAPL:** LNAPL exists in an isolated area at the site ranging in thickness up to 5 feet.

Basis for Corrective Action

The following are the primary corrective action issues that were the basis for consideration of remedial alternatives at the Wharf Revetment Area:

- **Groundwater impacted by hydrocarbons and LNAPL:** The impacted groundwater is confined to the upper 15 feet of the subsurface by a confining clay layer.
- **Surface water in Bayou Casotte possibly impacted by contaminated groundwater:** Calculations of groundwater velocity, hydrocarbon plume size and age, dilution and tidal influences suggest minimal impact to Bayou Casotte.
- **Potential for plant personnel coming into contact with contaminated Media:** Although contaminated material is subsurface at this site, potential exists for plant personnel to come into contact with the contamination through routine maintenance and excavation activities. Internal controls are used at this and all locations within the plant to protect personnel from contact with contaminated media. These controls include, but are not limited to, permit approvals prior to the initiation of any work, safety and environmental monitoring of known or suspected contamination sites, and contractor safety training to help contractors understand, identify and respond to suspected safety and environmental hazards.

Proposed Corrective Measures

The proposed corrective measures to meet the Performance Standards at the Wharf Revetment Area includes the following components of Alternatives 1 and 2:

- **LNAPL Recovery** as necessary to achieve permit Performance Standards.
- **Hydraulic control** as necessary, to prevent potential impacts to surface water in Bayou Casotte.
- **Vertical Sheetpile Barrier** to protect potential impacts to surface water in Bayou Casotte (already installed as an interim measure).
- **Monitoring of Groundwater Quality** for plume stability.

Lagoon No. 3

Lagoon No. 3 is part of the facility's National Pollutant Discharge Elimination System (NPDES) and is located on the eastern perimeter of the facility, adjacent to the GBNERR. The lagoon is a storm water retention pond that may also receive pre-treated water from the wastewater treatment system. It is a very large lagoon, being 120 acres in size and holding 220 million gallons of freshwater (the surrounding marsh is saline).

Summary of Potential Risks

The COCs identified for human health at Lagoon No. 3 during the RFI were:

- **Groundwater:** arsenic, beryllium, and lead along the eastern and northern perimeters of the lagoon.
- **Sediment:** arsenic, cadmium, chromium, chrysene, lead, nickel, vanadium, phenanthrene, and pyrene, with the majority of the impacted samples coming from the vicinity of the Catalyst Disposal Area on the west side of Lagoon No. 3. The potential environmental concern at this site is the ecological risk associated with the contaminated sediments in the Catalyst Disposal Area, (roughly 1 acre) situated between Lagoon No. 3 and the East Hill Landfill. While metals are present in the groundwater at this site, there is no risk of groundwater exposure to humans.

Lagoon No. 3 supports an abundant and varied fauna and flora. Unlike the surrounding natural marshlands, it is a freshwater habitat. Alligators and a wide variety of waterfowl have been observed in the Lagoon. (Large alligators are removed and placed in an alternate habitat). Lagoon No. 3 is considered by the EPA to be an 'attractive nuisance' for wildlife. Thus it has become the focus of an ongoing Ecological Risk Assessment. It is thought that the main risk to wildlife comes from a shallow area on the west side of Lagoon No. 3, or the eastern edge of the East Hill Area. This approximately 8 acre area, which includes the Catalyst Disposal Area, is contaminated with metals, including nickel and vanadium. It is sometimes submerged as a shallow water area during wet weather and sometimes exposed during dry weather. It was completely inundated during Hurricane Katrina. It is possible that waterfowl may consume contaminated sediment from this area. However, abnormal mortality of waterfowl has never been observed at Lagoon No. 3 or anywhere within the plant. Destruction of wildlife and freshwater habitat has become a concern if and when any remediation is attempted in Lagoon 3.

Basis for Corrective Action

The following are the primary corrective action issues that were the basis for consideration of remedial alternatives at Lagoon No. 3:

- **Groundwater impacted by metals:** While groundwater monitoring has shown metals present in the groundwater, there is no risk of groundwater exposure to humans since the shallow aquifers are not a drinking water aquifer.
- **Ecological issues associated with the Catalyst Disposal Area:** The next phase of ecological risk assessment will determine the risk associated with the impacted sediments.
- **Potential for groundwater to off-site surface water exposure:** Will be assessed as part of corrective action through groundwater monitoring.

Proposed Corrective Measures

The proposed corrective measures to meet the Performance Standards at Lagoon No. 3 include the following components:

- ***Further Evaluation:*** Determine the impact of contaminated sediments in Lagoon No. 3 through an ecological risk assessment that is currently under way.
- ***Perimeter Groundwater Monitoring:*** Continue to monitor groundwater quality in accordance with the permit.

MNA Sites

This group of SWMUs is composed of three tanks and the Paraxylene (PX) Complex. The contamination and the proposed remedy for the three tanks are similar: Tank 173 (AOC 65), Tank 331 (AOC 66), and Tank 333 (AOC 83) are all hydrocarbon storage tanks. EPA is favorably disposed toward MNA as a remedy for the three tanks. However, the proposed remedy for the PX Complex may be different from the three tanks. The PX Complex is a process unit that extracts paraxylenes from a mixture of aromatic hydrocarbons. Two sumps in the PX Complex leaked for a number of years and created a concentrated, localized plume of benzene, xylene, and ethyl benzene.

Summary of Potential Risks

The four sites; including Tank 173, Tank 331, Tank 333 and the PX Complex, have hydrocarbon plumes resulting from spills or releases from hydrocarbon storage or transfer conveyances, and some have reached an apparent stable condition. Three of the sites are strong candidates for MNA. The MNA Sites are located in the interior of the Refinery, and either in sparsely trafficked areas or under concrete (PX Complex). This isolation prevents human exposures to hydrocarbons from the plumes except for construction workers, and these are protected by controls on workers and protective equipment. There is no risk of groundwater exposure to humans since the uppermost aquifer is not a drinking water aquifer and the impacted groundwater is confined to the upper 15 feet of the subsurface by a confining clay layer.

The COCs identified for human health during the RFI were:

- ***Groundwater:*** Arsenic, benzene, beryllium, cadmium, ethylbenzene, leads, toluene, xylenes, 2, 4-Dimethylphenol, and naphthalene were detected in the groundwater from these sites and MTBE was also found in the groundwater at Tank 333.
- ***Soil:*** Benzene, toluene, ethylbenzene, xylenes and Total Petroleum Hydrocarbons (TPH) were identified in soil samples collected from these sites.
- ***LNAPL:*** LNAPL exists in three separate areas across the PX Complex ranging in thickness from 0.25 to 3.5 feet. LNAPL exists in one well at Tank 173 ranging in thickness up to 0.5 feet.

Basis for Corrective Action

The following are the primary corrective action issues that were the basis for consideration of remedial alternatives at the MNA Sites:

- ***Groundwater impacted by hydrocarbons and LNAPL:*** The MNA Sites are located in the middle of the Refinery and groundwater velocity is slow. Groundwater recharge at the PX Complex is minimal, due in large part to the concrete base for the process area.
- ***Potential for Groundwater to surface water discharge in the various ditches and canals to be affected by impacted groundwater:*** Groundwater velocities is slow and discharge to any ditches and canals would be limited in volume over time. Canals in the vicinity of the PX Complex are lined. The internal refinery ditches and canals flow into the refinery stormwater collection system, then into the NPDES permitted wastewater system. This water is monitored as part of the NPDES system.
- ***Potential for plant personnel coming into contact with contaminated media during plant operations:*** Internal controls are used at this location to protect personnel from contact with contaminated media. These controls include, but are not limited to, permit approvals prior to the initiation of any work, safety and environmental monitoring of known or suspected contamination sites, and contractor safety training to help contractors understand, identify and respond to suspected safety and environmental hazards.

In 2003, Chevron Products Company performed a Multiphase Extraction (MPE) evaluation test at the northeast plume and south plume in the PX Complex. The original intent was to develop data for sizing of a MPE system to use in conjunction with monitored natural attenuation. The test determined the ineffectiveness of that technology at this site. An evaluation of this test is found in the MNA report on the PX Complex (see bibliography).

Proposed Corrective Measures

The proposed corrective measures to meet the Performance Standards at the MNA Sites include the following components:

- ***Source Removal*** where practical and as needed to support MNA (LNAPL and/or contaminated soil).
- ***Groundwater Monitoring Program and Natural Attenuation*** study to evaluate natural attenuation of the organic constituents.
- ***Institutional Controls*** to eliminate worker exposure and further controls to manage future land use.
- ***Further Investigation*** down gradient of the PX Complex.

Acid Sites

The first acid site, the Stormwater SWMA, includes the Acid Retention Pond (SWMU 35) and the North Canal (SWMU 57). The Acid Retention Pond was a former surface impoundment. The unit was a 200-ft by 1,100-ft unlined pond constructed in the 1960s to receive a one-time

emergency release from a spent sulfuric acid tank. In 1980 the site was excavated and backfilled with clean soil. However, this did not remove all the acidity. The unit is now a parking lot covered with crushed limestone.

AOC 44, the Spent Sulfuric Acid Tanks 44, 45, and 48, is also known as the Sulfuric Acid Area. The low pH plume located under this AOC was generated through various spills and releases in the area. The area is covered with limestone, with concrete ditches on the north and south sides of the area.

The two acid generated plumes at the Stormwater SWMA and Sulfuric Acid Area are located in the interior of the Refinery. These two acid plume sites are collectively referred to as the Acid Sites. The plumes at the Acid Sites are located in the lower part of the uppermost aquifer, approximately 9 feet below ground surface (bgs). The surface geology typically consists of sand, silty sand, sandy silt, and clayey sand to depths of 12 to 14 feet bgs (Upper Sand), underlain by a confining clay layer (Upper Clay); the upper clay is approximately 15-foot thick.

The Acid Sites are presently being evaluated to determine the stability of the pH and the metals mobility. The plume under the tanks appears to be stable and/or decreasing in size. The plume under the Stormwater SWMA is slowly discharging into the NPDES wastewater treatment system via the North Canal.

Summary of Potential Risks

There is no risk of groundwater exposure to humans since the uppermost aquifer is not a drinking water aquifer and the impacted groundwater is confined to the upper 15-feet of the subsurface by a confining clay layer.

The COCs identified for human health during the RFI were:

- ***Groundwater:*** Antimony, arsenic, beryllium, cadmium, chromium, lead, nickel, vanadium, and acidic conditions in the shallow aquifer. pH levels ranged as low as 1.5 in the center of the acid plumes.
- ***Sediment:*** Chromium and nickel were detected in sediment samples collected from the North Canal.
- ***Surface Water:*** Depressed pH surface water is present in the North Canal during periods of extremely low flow.

Basis for Corrective Action

The following are the primary ***corrective action issues*** that were the basis for consideration of remedial alternatives at the Acid Sites:

- ***Groundwater impacted by metals and low pH conditions:*** The Acid Sites are located in the middle of the Refinery. An MNA demonstration for metals will determine the characteristics of the impacted groundwater and determine if the metal contamination is naturally decreasing.

- ***Surface water quality in the North Canal affected by impacted groundwater at the Stormwater SWMA:*** The North Canal ultimately flows into the Outfall Canal. These surface water canals are part of the NPDES permitted system and are monitored as such. Moreover, the approximate amount of groundwater displaced from the Acid Retention Pond into the NPDES System (North Canal to Outfall Canal) is 750 gallons per day.

The average discharge rate of the Refinery NPDES System through the Outfall Canal (002 Outfall) is 630,000 gallons per day. No substantive impact to the NPDES System has occurred.

- ***Plant personnel coming into contact with low-pH media***

during plant operations: Because of its depth, there is little possibility for plant personnel and contractors to come into contact with the low pH waters. Excavations for foundations and utilities are kept above the water table to avoid high moisture content areas. Internal controls are used at this location to protect personnel from contact with contaminated media. These controls include, but are not limited to, permit approvals prior to the initiation of any work, safety and environmental monitoring of known or suspected contamination sites, and contractor safety training to help contractors understand, identify and respond to suspected safety and environmental hazards.

Proposed Corrective Measures

Chevron Products Company's proposed remedy to meet the Performance Standards for these sites is to remove contaminated sediments from the North Canal (an interim measure) and to monitor the plumes for stability and natural attenuation rather than draw uncontaminated ground water into the sites. Institutional controls will be used to prevent worker exposures to subsurface contamination during construction activities. The facility has implemented corrective measures at the Acid Sites to include the following components:

- Sediments within the North Canal were removed and properly disposed of and a liner system was installed and limestone placed inside the canal to prevent further migration of COCs and low pH groundwater into the canal (to be determined by the natural attenuation study).
- Land use restrictions designed to prevent exposure to site contamination have been implemented.
- A groundwater monitoring program and natural attenuation study to evaluate natural attenuation of the dissolved metals is underway.

Metals Sites

The Blending Chemical Additive Area (AOC 71) and the Middle Ditch (AOC 85) have similar metals contamination. They are collectively referred to as the Metal Sites.

The Blending Chemical Additive Area was constructed in 1963, and is approximately 300-ft by 100-ft. All the pumps for this area are located on concrete surfaces, but tanks and piping are not. The area has segregated sewer systems for oily water and for rainwater runoff. The Blending Chemical Additive Area is utilized as a storage location and an area for blending of chemicals

which are injected into finished products.

Under the Refinery Tank Inspection Program, holes were discovered in Tanks No. 30 and 33. The holes in these two tanks were caused by bottom corrosion. The tank bottoms were repaired or replaced. Tank overfills may have been an additional source of contamination. The Blending Chemical Additive Area is currently active.

In October 2002, Chevron Products Company performed a routine maintenance that included removal of sediments from the Blending Chemical Additive Area ditch. During this maintenance activity, Chevron Products Company removed approximately 5,000 pounds of sediment from the ditch. The oily non-hazardous material was recycled on site at the Oily Sludge Coke Recycling Facility.

The Middle Ditch is a concrete-lined ditch for conveying stormwater to the Stormwater Management Tanks. This concrete-lined ditch is approximately 1600-ft long, 8-ft wide, and has a depth of 1-ft on the north end to approximately 5-ft on the south end. The Middle Ditch was constructed in 1963 and is currently active.

Chevron Products performed routine maintenance activities at the Middle Ditch in July 2002. During this maintenance activity, Chevron Products removed approximately 15,000 pounds of sediment from the ditch. The non-hazardous material was recycled on site at the Oily Sludge Coke Recycling Facility.

Summary of Potential Risks

The COCs identified for human health during the RFI were:

- **Groundwater:** Arsenic, manganese, naphthalene, and vanadium were detected in the groundwater from the Metals Sites. There is no risk of groundwater exposure to humans since the uppermost aquifer is not a drinking water aquifer and the impacted groundwater is confined to the upper 15 feet of the subsurface by a confining clay layer.

Basis for Corrective Action

The following are the primary *corrective action issues* that were the basis for consideration of remedial alternatives at the Metals Sites:

- **Groundwater impacted by metals:** The Metals Sites are located in the middle of the Refinery.
- **Surface water quality in the various Refinery ditches and canals affected by potentially impacted groundwater from the various sites:** The internal Refinery ditches and canals ultimately flow into the stormwater collection system and then the Outfall Canal. This surface water is monitored as part of the NPDES System.

Summary of Alternatives Evaluated

No remediation alternatives other than routine maintenance activities were considered for the Blending Chemical Additive Area and Middle Ditch. These measures will be repeated in the future when needed.

Proposed Corrective Measures

The proposed corrective measures to meet the Performance Standards at the Metals Sites include routine maintenance and removal of contaminated sediments, plus monitoring of groundwater quality.

Miscellaneous Tankfield Sites

The area referred to as the West Tankfield, includes the area encompassed by Tanks 406, 407, 408, 409, 412, 422, which are crude receiving tanks, and Tank 423. The west tankfield is approximately 100 to 150-acres in size. The Miscellaneous Tankfield Sites includes Tank 190, which is a recovered oil tank. Together, these sites have similar contamination issues. With the exception of Tank 423, the groundwater in the vicinity of these sites discharges into NPDES monitored surface water units. Groundwater movement is slow in the tankfield areas and discharge is limited.

Summary of Potential Risks

Groundwater from the uppermost aquifer in the West Tankfield Area is impacted by varying levels of benzene, naphthalene, and metal compounds. Groundwater in the vicinity of Tank 423 is impacted by low levels of MTBE. At least three releases of recovered oil have been recorded from Tank 190. Groundwater from the uppermost aquifer is impacted by varying levels of VOCs, SVOCs, and metals. Groundwater was found to contain chlorinated organic compounds but no Dense Non-Aqueous Phase Liquids (DNAPL) were found at the bottom of the uppermost aquifer. The COCs identified for human health during the RFI were:

- **Groundwater:** Arsenic, benzene, beryllium, cadmium, carbon tetrachloride, chloroform, 1,2-dichloroethane, dichloromethane, lead, methylene chloride, MTBE, and naphthalene were detected in the groundwater from these sites.

There is no risk of groundwater exposure to humans since the uppermost aquifer is not a drinking water aquifer and the impacted groundwater is confined to the upper 15 feet of the subsurface by a confining clay layer.

Basis for Corrective Action

The following are the primary *corrective action issues* that were the basis for consideration of remedial alternatives at the Miscellaneous Tankfield Sites:

- ***Groundwater is impacted by hydrocarbons and metals:*** There is no human exposure from groundwater.
- ***The potential for surface water quality in the various Refinery ditches and canals to be effected by potentially impacted groundwater from Tank 190:***
The effluent from the Refinery in the ditches and canals is monitored as part of the NPDES System.
- ***The potential for surface water quality on the Operational Boundary (West Tankfield) to be effected by impacted groundwater:*** This issue will be addressed as part of corrective action through groundwater monitoring.
- ***The potential for plant personnel coming into contact with contaminated media during plant operations:*** Internal controls are used at these locations to protect plant personnel from any contact with contaminated media. These controls include, but are not limited to, permit approvals prior to the initiation of any work, safety and environmental monitoring of known or suspected contamination sites, and contractor safety training to help contractors understand, identify and respond to suspected safety and environmental hazards. Other activities include routine tank maintenance used to inspect and refurbish aboveground storage tanks.

Proposed Corrective Measures

The proposed corrective measures to meet the Performance Standards at the Miscellaneous Tankfield Sites include the following components:

- Monitoring of groundwater quality for plume stability, and MTBE degradation products.
- Monitored Natural Attenuation for MTBE using EPA accepted protocols at T-423.
- Implementation of land use restrictions designed to prevent exposure to site contaminants.
- MTBE is no longer produced or stored at the facility.

East Hill Area

The East Hill SWMA includes a grouping of SWMUs and AOCs on the east side of the Refinery including SWMU 1 (Landfill A), SWMU 2 (Landfill B), SWMU 3 (Landfill C), SWMU 4 (Landfill D), SWMU 60 (Fire Training Area), AOC 72 (Landfill Beneath TEL Weathering Area), and AOC 82 (Landfills Underneath the East Landfarm /Catalyst Pad).

The East Hill SWMA is bounded on the north and east sides by SWMU 10 (Lagoon 3), to the south by Lagoon No. 3 discharge canal and SWMU 68 (Old FCC Catalyst Fines Disposal Area), and to the west and northwest by the Collection Canal. The approximate size of the combined landfill areas (A, B, C, and D) that occupy the central portion of East Hill is 500-feet long by 750-feet wide at the widest point. Landfill A was used for disposal of salt, rock, coal, various catalysts, sand, elemental sulfur and carbon, operating from mid 1960's through 1982. Landfill B was used for disposal of wooden cooling tower boards for a short time in 1979. Landfill C was used for disposal of drums of leaded gasoline tank bottoms, API separator sludge, and lead contaminated materials, operating from an unknown date through 1972. Landfill D was used for

disposal of asphalt, drums of residuum, and Refinery-related organics for a short period around 1972. These landfills were capped and closed with waste in place under the State's Solid Waste Management Program.

The Fire Training Area (SWMU 60) is also located on the East Hill, and consists of two bermed concrete pads measuring approximately 195 feet by 250 feet and 95 feet by 130 feet in size. The Fire Training area is isolated at the northern end of East Hill. The top 6-inches of stained soils were removed from this location for disposal at an off-site Class D landfill in the early 1990s.

The landfill associated with AOC 72 is located beneath the closed TEL Weathering Area and is one of the landfills still under consideration for future corrective measures.

AOC 72 contains unspecified Refinery wastes. The period of operation for AOC 72 is unknown, but believed to be during the 1970's. The landfill associated with AOC 82 is located beneath the East Landfarm Area in the southern portion of the East Hill SWMA and is another area where the remedy has not yet been selected. This landfill has been closed since the late 1970's and also contains unspecified Refinery wastes that were land-filled during the 1970's.

Groundwater is typically present at an elevation of 3 to 5 feet Mean Sea Level (MSL) and flows radially away from the East Hill at an average velocity of 1.5 feet per year; Groundwater is somewhat mounded beneath the East Hill, with respect to surrounding area, due to elevated topography of the East Hill. Subsurface soils and groundwater from the shallow aquifer at the East Hill are impacted with varying levels of Semi-Volatile Organics (SVOCs) and metal constituents. The facility believes that all groundwater discharges from the East Hill go into the wastewater treatment system. EPA believes that some of the groundwater discharges may find their way into Lagoon 3.

Summary of Potential Risks

The COCs identified for human health at the East Hill during the RFI were:

- **Groundwater:** arsenic, cadmium, chrysene, lead, and naphthalene in the shallow groundwater aquifer in three distinct areas including north of the Fire Training building, in the central portion of the landfill, and in the southern portion of the landfill near the catalyst pad and container storage area. There is no potential risk to human health since groundwater is not used as a drinking water source.
- **Soil:** SVOCs including benzo (a) anthracene, benzo (b) fluoranthene, benzo (a) pyrene, and dibenz (a, h) anthracene in subsurface soil reaching 8 feet bgs located on east side of East Hill near the Catalyst Disposal Area, that encroaches onto the adjacent Lagoon No. 3. At this time there is no human health risk in the East Hill SWMA because all landfilling activities in this area have been ceased.

Basis for Corrective Action

The following are the primary corrective action issues that were the basis for consideration of remedial alternatives at the East Hill:

- **Potential for groundwater to be impacted by contaminated soil and/or**

landfill materials that are in direct contact with the groundwater: There is no risk of contaminated groundwater exposure to humans; however, there may be a risk of contaminated groundwater exposure to the ecosystem.

• ***Potential for on-site surface water surrounding the East Hill to be impacted***

by groundwater moving from the East Hill: Surface water surrounding the East Hill is part of the active NPDES treatment system and is monitored as such. The approximate amount of groundwater displaced from the East Hill to the NPDES System (Outfall Canal and Lagoon No. 3) is 3,000 gallons per day, whereas, the average discharge rate of the Refinery NPDES System through the Outfall Canal (001 Outfall) is 12,000,000 gallons per day. Therefore the East Hill makes up a negligible portion of the plant discharge.

Proposed Corrective Measures

EPA and the facility have not yet agreed on the proposed remedy to meet the Performance Standards for the East Hill Area. The facility's proposed corrective measure would be to monitor groundwater for plume stability and to look at possible ecological issues related to the discharge of groundwater into Lagoon No. 3 through the ecological risk assessment currently being conducted for Lagoon No. 3. Institutional controls would be used to prevent human exposures to subsurface soils contamination. EPA favors a more direct approach to control of potential contaminant migration into the ecosystem.

Wastewater Treatment Area

The Wastewater Treatment Area includes the Wastewater SWMA and the Oily Dirt Pile. The Wastewater SWMA consists of all the active lagoons used by the Refinery for treatment of hydrocarbon impacted process water, prior to discharge under the Refinery's NPDES permit. The current Wastewater SWMA is made up of the following units:

SWMU 6 - Skim Pond
SWMU 7 - Aeration Basin
SWMU 8 - Lagoon No. 1
SWMU 9 - Lagoon No. 2
SWMU 11 - South Surge Pond
SWMU 12 - North Surge Pond
SWMU 80 – Oily Dirt Pile

The bodies of water that make up this SWMA have been operational since the Refinery's initial construction in 1963. The Oily Dirt Pile (SWMU 80) is a small area situated between the South Surge Pond and the collection canal in the Wastewater Treatment Area. The pile is used for consolidation of non-hazardous oil contaminated soil from the facility, prior to shipment to a RCRA Subtitle D landfill. Because of its location, runoff from the Oily Dirt Pile enters the unlined WasteWater Treatment System.

One of these SWMUs, the Skim Pond, has already been declared No Further Action (NFA) by EPA. For a detailed description of each SWMU making up the Wastewater Treatment Area, Section 4.8 of CMS Report should be consulted.

All process and storm waters within the operational boundaries of the Refinery, east of Hwy 611, are channeled into the wastewater treatment ponds. Groundwater, discharging into surface water features (ditches and canals), is also captured and treated in this system. The system is permitted under the Clean Water Act and discharges into the Outfall Canal; a two mile long mixing zone that eventually discharges into the Mississippi Sound, south of the Refinery. Throughput in the wastewater treatment area averages 12 million gallons per day through Lagoon No. 1 and Lagoon No. 2 at Outfall 001, and 600,000 gallons per day from the North Surge Pond at Outfall 002.

Some physical and geological characteristics of the Wastewater Treatment Area are summarized below:

- The surface geology typically consists of silty and clayey sands with localized sand and clayey sand lenses (Upper Sand) extending to the upper confining clay (Upper Clay), which is located at depths of approximately 15 to 18 feet bgs.
- Groundwater appears to flow east toward the Collection Canal and north toward the North Surge Pond, at an estimated groundwater velocity of 1 foot per year.
- As expected, various concentrations of VOCs, SVOCs, and metals were found in the sediment and surface water samples from the Wastewater SWMA lagoons.
- Groundwater is impacted by metals at two locations on the perimeter of the Wastewater SWMA (between Lagoon No. 1 and the Collection Canal; the southeast corner of South Surge Pond).

Summary of Potential Risks

There is no known risk to human health from the Wastewater Treatment Area. The potential for ecological risk from the Wastewater Treatment System is minimal. The North and South Surge Ponds and Lagoons 1 and 2 were included in the facility's Screening Level Ecological Risk Assessment and the results for ecological risk were negative. Certain portions of the Wastewater Treatment Area such as the North and South Surge Ponds attract some waterfowl, and a few waterfowl have been observed in these SWMUs.

Basis for Corrective Action

The following are the primary corrective action issues that were the basis for consideration of remedial alternatives at the Wastewater Treatment Area:

- ***Groundwater impacted by metals:*** The site is located in the eastern portion of the Refinery. There is no risk of groundwater exposure to humans since the uppermost aquifer is not a drinking water aquifer and the impacted groundwater is confined to the upper 15 feet of the subsurface by a confining clay layer.

- ***Surface water in the Wastewater Treatment Area expected to be impacted by groundwater moving from the site:*** Surface water is part of the active NPDES treatment system and is monitored as such.
- ***Sediments in the Wastewater Treatment Area expected to be impacted by surface water moving from the site:*** Sediments are part of the active NPDES treatment system and are monitored as such.

Proposed Corrective Measures

The Wastewater Treatment Area is an active part of the Refinery operations. As such, corrective action at this site will be addressed when Refinery operations or use of the wastewater treatment system ceases. Although these NPDES components are SWMUs, they are also an integral part of the Refinery's compliance system for the Clean Water Act. These wastewater treatment units are designed to treat process water and precipitation from the refinery processes, and discharge it through the permitted NPDES discharge points. Because these components are part of an operating NPDES treatment system, the proposed corrective measure is to monitor the groundwater at the operational boundary for possible impacts from these sites, and to maintain these units operationally until they are no longer in service. Upon cessation of operations of these treatment systems, both EPA and the facility agree that they will be closed in a manner consistent with RCRA and HSWA closure requirements or the future enforceable successor requirements to RCRA and HSWA.

CLEANUP GOALS

Overall, if the corrective measures proposed above are not successful in achieving the Performance Standards listed in the permit, Chevron Products Company will present other alternatives to EPA for consideration in addressing these issues. Because these plumes are onsite and the facility continues to be an industrial facility, Chevron Products Company and EPA will evaluate ongoing corrective action consistent with Industrial Standards. If an offsite release were discovered at some time in the future, other standards would apply, either residential, ecological, or appropriate alternatives.

The corrective action strategy for this facility is to protect human health and the environment from the effects of releases of hazardous waste or hazardous constituents. Groundwater is monitored within the facility and at the operating boundary of the facility. The operating boundary is considered the point of compliance for groundwater. Groundwater must meet Maximum Contaminant Limits (MCLs) or appropriate Water Quality Standards (WQS) at the point of compliance. The Performance Standards described in the HSWA permit are as follows: MCLs or background for groundwater at the point of compliance, Region 9 Preliminary Remediation Goals for soils and surface waters not regulated under the Clean Water Act, and Region 4 Risk Based standards for sediments. For current and reasonably foreseeable future land use at the facility, the Chevron Products Pascagoula Refinery must meet Industrial Standards, except for MCLs. There are no Industrial Standards for MCLs for groundwater. Groundwater internal to the refinery must not have an adverse effect on the NPDES system. Internal to the refinery, institutional controls will be used for groundwater exposure.

BIBLIOGRAPHY

ChevronTexaco. 2005. Final Ecological Risk Assessment Addendum to the Phase II RFI Report for the Pascagoula Refinery, ERA for East Hill and Lagoon No. 3 Pascagoula Facility. Pascagoula, Mississippi. January 2005.

ChevronTexaco. 2004. Draft Final Monitored Natural Attenuation Evaluation AOC 77-Paraxylene Complex. Chevron Products Company Pascagoula Refinery. Pascagoula, Mississippi. August 2004.

ChevronTexaco. 2004. Draft Final Monitored Natural Attenuation Evaluation AOC 66- Tank 331. Chevron Products Company Pascagoula Refinery. Pascagoula, Mississippi. August 2004.

ChevronTexaco. 2004. Draft Final Monitored Natural Attenuation Evaluation AOC 65- Tank 173. Chevron Products Company Pascagoula Refinery. Pascagoula, Mississippi. August 2004.

ChevronTexaco. 2004. Draft Final Monitored Natural Attenuation Evaluation AOC 83- Tank 333. Chevron Products Company Pascagoula Refinery. Pascagoula, Mississippi. August 2004.

ChevronTexaco. 2004. Final Corrective Measures Study Report, Chevron Pascagoula Refinery, Chevron Environmental Management Company and Chevron Products Company Pascagoula, Mississippi, April 2004.

Chevron. 2001. Final RCRA Facility Investigation and AOC Confirmatory Sampling Report, Prepared by Brown and Caldwell for Chevron Pascagoula Refinery, September 2001.

USEPA. 1997. HSWA Portion of the RCRA Permit. Chevron U.S.A., Inc. Mississippi Highway 611, Pascagoula, Mississippi. EPA ID No. MSD054179403. September 26, 1997.

Chevron. 1997. Final Phase I RFI Report, Prepared by Environmental Science & Engineering, Inc. for Chevron Pascagoula Refinery, March 1997.

USEPA. 1990. Contract No. 68-W9-0040; Work Assignment No. R04-04-09; Chevron USA; Pascagoula, Mississippi; EPA ID No. MSD054179403; RCRA Facility Assessment; Final Deliverable. AT Kearney, August 1990.